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the failure of the continuity of error, that the distribution of errors in accordance with the law prescribed by theory must fail unless they are counted within limits which include the limit of sensibility.

I do not wish to be understood in these remarks as under-estimating the value of such investigations as these on the Pole Star, or the usefulness of repeated attempts to reach the utmost limits of refinement attainable by computation, nor as depreciating the importance of watchful criticism of one another on the part of astronomers. But, as I have said, I was apprehensive that some who are not astronomers, from the circumstances attending the publication of Mr. Safford's paper, might attach to his correction of the place of the Pole Star a *practical* importance which I think Mr. Safford himself would not claim for it, and might needlessly fear that the Nautical Almanac, the Coast Survey, and the National Observatory had suffered injury from the use of an erroneous element.

Five hundred and fortieth Meeting.

October 11, 1864.—MONTHLY MEETING.

The PRESIDENT in the chair.

Dr. Pickering made the following communication:—

"After finding the names of lunar months in 1 Kings vi. 1 to 38, and viii. 2 (Chron. Obs. on Animals and Plants, p. 165), I was led to suspect that one of the measures of Jeroboam to prevent the reunion of the Hebrew people was the introduction of the Lunar calendar.

"Commencing a calculation by this calendar, I found in the death of the king of Israel and the king of Judah, both by the hand of Jehu, the seeming discrepance of three years in the Bible reduced to B. C. 877 y. 357$\frac{5}{36}$ d. — 877 y. 317$\frac{344}{360}$ d. = less than forty days.

"Continuing the calculation until the capture of Jerusalem by Jehoash, I found that King Amaziah was permitted to live after this event 'fifteen years' = half the so-called Muslim cycle, 'thirty years of twelve lunations = 10,631 days.' I was further surprised at finding that this half did not leave a fractional day, = 14 Julian years 202 days. A further reduction being even possible, 7½ lunar years or ninety lunations = 7 Julian years 101 days.

"Here then was the means of substituting one calendar for another without interrupting a reckoning in lunations. And in Eastern countries, where the public observance of the lunations is part of the duty of government, the change may have been repeatedly effected.

"After the capture of Jerusalem by Jehoash, the calendar of Israel was imposed on Judah, the Biblical computation thenceforward being exclusively in lunar years; the date of the death of Sennacherib agreeing with that given by Herodotus. Josephus, in seeming opposition to the Bible, gives '130 years, 6 months, 10 days' from the captivity of the ten tribes to the destruction of the temple. If the Biblical account is in lunar years, these give 130 Julian years, 6 lunations, $2\frac{72}{90}$ days. From the destruction of the temple to the second year of Darius, two known points in chronology, is according to the Bible (2 Chron. xxxvi. 21, Hagg. i. 1, Zech. i. 1 to 16, vii. 1 to 5, and Ezr. iv. 24) 'seventy years'; this is true of lunar years only."

Mr. C. M. Warren presented two memoirs, and gave the following synopsis of the conclusions arrived at, viz.: —

Under the general title, *Researches on the Volatile Hydrocarbons*, a memoir bearing the following title, viz.: *On the Volatile Hydrocarbons from Coal-tar Naphtha, Oil of Cumin, and Cuminic Acid; with a Preliminary Notice of some of the Facts derived from the Study of the Light Oils from Wood-tar.*

Also, under the same general title, a second memoir bearing the following title, viz.: *On the Influence of $C_2 H_2$ on the Boiling-points in Homologous Series of Hydrocarbons, and in some Series of their Derivatives; including critical Remarks and Observations on Methods of determining Boiling-points.*

In the first memoir I propose to show: —

1. That coal-tar naphtha contains only four hydrocarbons within the range of 80° – 170° C., as taught by Mansfield and confirmed by Ritthausen.

2. That the benzole series within that range of temperature is limited to four members; and does not contain five, as asserted by Church.

3. That these four members have the boiling-points 80°, 110°, 140°, and 170° respectively; and consequently, that the boiling-point difference in this series for an elementary difference of $C_2 H_2$ is 30°, instead of 22° and a fraction, as alleged by Church.

4. That the body obtained from coal-tar naphtha boiling at 140° is

not identical with cumole from cuminic acid, (as assumed by Mansfield, and generally credited,) nor even isomeric with it; but that it has the formula which has been assigned to xylole.

5. That the body obtained from coal-tar naphtha boiling at 170° is quite a different body from cymole obtained from oil of cumin, (with which it has been considered identical, as was also assumed by Mansfield,) — these bodies differing from each other by $C_2 H_2$.

6. That cumole from cuminic acid, and cymole from oil of cumin, do not even belong to the benzole series.

7. That the parabenzole of Church was in all probability simply a mixture of benzole and toluole.

In the second memoir it is shown: —

1. That the boiling-point difference for the addition of $C_2 H_2$ in homologous series of hydrocarbons is generally 30°; which is a much larger difference than has generally been supposed.

2. That, of the five series of hydrocarbons examined, only one series was found exceptional; and this series presents the difference of about 20°; which is but little larger than the number, 19°, which Kopp found to be so common with other classes of substances.

3. That the formulæ of Schröder, Löwig, and Gerhardt for the calculation of boiling-points, so far as these relate to the hydrocarbons, are purely artificial.

4. That certain series of derivatives from the benzole series of hydrocarbons present boiling-point differences corresponding to an elementary difference of $C_2 H_2$, considerably smaller than the number 19° of Kopp.

5. That the custom of taking boiling-points with the bulb of the thermometer in the vapor, is more liable to lead to an erroneous determination — at least in certain cases — than if the bulb be placed in the liquid.

Five hundred and forty-first Meeting.

November 9, 1864. — STATUTE MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read a letter from Frederick Overbeck of Rome in acknowledgment of his election into the Academy.